Variations of acoustic and electric fields on the base of observations in the Mikhnevo GPhO and CGM IDG RAS

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Atmospheric pressure and electric field potential gradient synchronous variations can be observed in a series cases when the sources of these changes are natural and man-made processes. In the case, synchronous perturbations of the pressure and electric fields are observed in the atmospheric surface layer for a quite wide range of oscillation periods: starting from oscillations at the Brunt-Väisälä frequency and lower to the acoustic (infrasonic) region oscillations. It is known that during the atmospheric fronts passage, the change of parameters such as pressure, temperature and the atmospheric electric field potential gradient are closely related to each other. The pressure and electric field records mutual processing showed that the developed convection in the atmosphere and thunderstorm activity associated with it are followed by the acoustic-gravity waves generation and the accompanying atmospheric electric field disturbances, and there is an approximate proportionality between the amplitudes of the electric field disturbances and the amplitudes of pressure.

In the report, in addition to atmospheric pressure and electric field potential gradient variations associated with the atmospheric fronts passage, disturbances due to the solar terminator passage are considered on the basis of observations at the Mikhnevo Geophysical Observatory (GPhO) and the Geophysical Monitoring Center (GMC) IDG RAS. The data obtained from in situ observations processing was carried out using the pressure and electric field variations wave form cross-correlation analysis. It was determined that synchronous low-frequency atmospheric pressure and electric field potential gradient oscillations with periods close to the Brunt-Väisälä frequency are recorded during the morning terminator passage. The main maximum in the power spectra is at the same frequency both for pressure variations and for the electric field intensity. Synchronous variations of pressure and electric field potential gradient can be distinguished in conditions close to “fair-weather”, when the influence of adverse meteorological events is minimized.